TARGET PAPER 2023
PHYSICS XII

Chapter 11:

1. Write down the two statements of second law of thermodynamics and prove their equivalence.
2. What is Carnot Engine? Describe its construction, working, and derive an expression for its efficiency
3. Write the postulates of kinetic molecular theory of gages and show that average translation Kinetic Energy per molecule is directly proportional to the absolute temperature.
4. State the First Law of thermodynamics and explain on its basis: (a)isobaric process (b)Isothermal process (c) adiabatic process and (d) isochoric process.
5. Derive the Cp-Cv=R, symbols have their usual meanings.

Problems: 11.3, 11.4, 11.6, 11.9 & 11.11

Chapter 12:

1. What is compound capacitor? Derive an expression for its capacitance, if the space between the plates is partially filled with a slab of dielectric.
2. Define capacitance. Derive an expression for the capacitance of a parallel plate capacitor when space between the plates is:
   (i) filled with a dielectric.
   (ii) Free space between plates.
3. Derive the relation between the electric intensity and electric potential?
4. Prove that 1Volt/ Meter = 1Newton / Coulomb, name the physical quantity which has these units?

Problems: 12.1, 12.6, 12.8, 12.10, 12.11, 12.15, 12.17 & 12.19

Chapter 13:

1. State the law governs the potential difference across the conductor and the current passing through it. How the resistances of a conductor related to its dimensions?
2. Differentiate between terminal potential difference and EMF of a battery. Derive the relevant expression?
3. Derive the equivalent resistance when resistors are connected in series and parallel.

Examples: 13.5, 13.6, 13.8 & 13.10

Problems: 13.5, 13.10, 13.11, 13.12, 13.16, 13.17, 13.18, 13.19 & 13.21.

Chapter 14:

1. State Faraday's Law of Electromagnetic Induction. Explain the phenomenon of mutual or self-Induction.
2. Derive the relation for force on a current carrying conductor in a uniform magnetic field?
3. Determine the method for determining the charge to mass ratio of an electron. Derive the mathematical relation.
4. Draw the labeled diagram of an AC generator and derive the expression for alternating voltage produced.
5. Define and derive the expression of motional emf.

Problems: 14.1, 14.6, 14.7, 14.8, 14.10, 14.11, 14.12, 14.13, 14.14 & 14.15.

Chapter 15:

By:
Sir Shoaib Ahmed

1. Define ammeter and voltmeter. How the galvanometer converts into an ammeter and voltmeter.
2. What is meant by a balance Wheatstone Bridge? Derive an expression for it.

   Problems: 15.2, 15.3, 15.5 & 15.7

Chapter 16:

1. What is a semiconductor diode? Differentiate b/w intrinsic & extrinsic semi-conductor.
2. What is PN junction? Explain the formation of potential barrier in PN junction?
3. Describe the working of NPN or PNP transistor.

Chapter 17:

1. Explain the Pair Production briefly?
2. State the basic postulates of the Special Theory of Relativity and write it consequences.
3. What is Photoelectric Effect? With the help of graph discuss some of the important results of this theory. Derive Einstein's photoelectric equation.

   Examples: 17.7, 17.8, 17.9, 17.11, 17.12 & 17.13

   Problems: 17.3, 17.4, 17.10, 17.12 & 17.15.

Chapter 18:

1. Derive the expression of the wavelength of photons emitted in hydrogen spectrum and write the different spectral series.
2. State Bohr's postulates for hydrogen atom. Applying Bohr's postulates on hydrogen atom and derive an expression for the radius of the nth orbit.
3. Describe the construction and working of ruby laser.

   Examples: 18.3 & 18.4 Problems: 18.2, 18.3, 18.4 & 18.5

Chapter 19:

1. What is Nuclear Fission? Discuss Fission Chain reaction. How the chain reaction control and which device is used, explain?
2. Write the equations showing the change in the parent nuclei by α, β and γ decay?
3. State and explain the law of radioactive decay with its exponential curve and derive half-life.

   Examples: 19.4 & 19.6 Problems: 19.4 & 19.6

Chapter 20:

1. Describe the construction & working of Geiger counter with the help of diagram.

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